

REMARKS

Claims 10-17 are presently pending in the application.

Election/Restrictions

In Paper No. 12, the Examiner has required an election of species asserting that the application contains claims directed to three distinct species: Species A, drawn to Fig. 2; Species B, drawn to Fig. 3 and Species C, drawn to Figs. 4 and 5. The Examiner contends that: Species A shows a sensor and exposed length of wires introduced into a covering as recited in claims 11-14; Species B shows that a covering tube slipped over an insulated portion of a cable as recited in claims 15 and 16; and, Species C shows that the covering tube comprises at least two layers including at least an outer material and an inner material coupled together as recited in claims 15 and 17. The Examiner states that claim 10 is generic and has withdrawn claims 11-14 and 17 based a provisional election of Species B (claims 10 and 15-16) made by William Youngblood on July 16, 2003.

Applicant affirms the provisional election of Species B (claims 10 and 15-16), with traverse. Applicant argues, most strenuously, that the Examiner's election of species requirement is improper since it is illogical that Fig. 2 and Fig. 3 are deemed two different species (Species A and B) while Fig. 4 and Fig. 5 are deemed a single species (Species C), considering that the drawings clearly show that a similar difference exists between Figs. 2 and 3 as exists between Fig. 4 and Fig. 5; that is, a greater length of a covering from one figure to the next. Also, it is unclear from the Examiner's election of species requirement whether Fig. 1 belongs to Species A as it illustrates an alternative embodiment of the covering element consisting of an outer sheath rather than a covering tube as claimed, for example, in claims 11 and 12.

Although Applicant strongly disagrees that an election of species requirement is proper in this application, to the extent the Examiner is compelled to maintain an election of species requirement, Applicant inquires whether the species should be as follows: Species A, drawn to Fig. 1 and as recited in claims 11-14; and, Species B, drawn to Figs. 2-5 and as recited in claims 15-17. This seems to be more logical since claims 11-14 (and claim 10) are directed to a method of manufacturing a temperature probe consisting of steps, including introducing the

sensor and the exposed lengths of wires into a covering element, while claims 15-17 recite the covering element as comprising a covering tube.

Specification and Claim Objections

The Examiner has stated that the title of the invention is not descriptive. While not necessarily agreeing with the Examiner, the TITLE OF THE INVENTION section of the application has been amended to recite the title suggested by the Examiner.

The Examiner has objected to claims 10 and 15-16 because it was confusing to the Examiner as to whether only one end of wire of the cable is connected with a sensor or a pair of wires is connected with the sensor. The Examiner also stated that the phrase “the exposed lengths” lacks antecedent basis. Claim 10 has been amended to clarify that a sensor is soldered to at least one pair of conducting wires at the exposed length of wire, as shown, for example, in Figs. 1-5. The phrase “the exposed lengths” was amended to provide proper antecedent basis.

No new matter has been added by the amendments to the TITLE OF THE INVENTION and claim 10, and entry of the amendments is respectfully requested.

Claim Rejections – 35 U.S.C. § 102(b)

The Examiner has rejected claims 10 and 16 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,749,656 of Boehm, et al. (“Boehm”). The Examiner argues that Boehm teaches a method of making a thermal probe assembly comprising steps of: introducing a sensor and exposed lengths of wire into a covering element made of insulating material such as plastic, which is compatible with the insulating material of a sheath of a cable; covering the sensor and the exposed lengths of wire by overmolding the sensor and the exposed lengths with a plastic material, which is compatible with the insulating material of a sheath of a cable. The Examiner adds, with regard to claim 16, that the covering element comprising a covering tube is cover[ing] the insulated portion of the cable.

Applicant traverses the Examiner’s §102(b) rejection and the arguments in support thereof for the reasons that follow.

Claim Rejections – 35 U.S.C. § 103(a)

The Examiner has rejected claim 15 under 35 U.S.C. § 103(a) as being unpatentable (obvious) over Boehm. The Examiner acknowledges that Boehm does not teach a process of placing and blocking the covering element in a mold to prevent the element from moving during the injection molding process, but contends that the overmolding covering step in Boehm is an

injection molding process. The Examiner concludes that, even though Boehm does not teach how the insulating plastic material is injected into the covering element, it would have been obvious at the time the invention was made to a person of ordinary skill in the art to have provided placing the covering element fit into a mold die prior to perform[ing] the injection molding process to prevent from moving or vibrating during the injection process.

Applicant traverses the Examiner's §103(a) rejection and the arguments in support thereof for the reasons that follow.

The present invention is directed to a probe having a covering element made of a thermoplastic material which is the same as or is compatible with the material of the insulating sheath which insulates at least one pair of conducting wires (see claim 10). A sensor and exposed lengths of the conducting wires are overmolded (e.g., fused) together with a thermoplastic material, which is the same as or is compatible with the material of the insulating sheath, to form a single body (see claim 10 and ¶¶ 26 and 31).

Applicant submits that the closest prior art is discussed in the application and not in Boehm. Thus, Applicant acknowledges that overmolding a temperature sensor with a thermoplastic material which is the same (or compatible) material as an outer sheath of a cable was known prior to the present invention (see, e.g., ¶¶ 4 and 6). However, through extensive investigation and inventive activity Applicant has overcome several technical problems associated with known overmolding processes, including the difficulty associated with manufacturing a small probe terminal which has a guaranteed thickness of insulating material, in a simple and effective manner (see ¶¶ 7-8).

The probe assembly disclosed in Boehm is well known in the field. Applicant elected not to cite Boehm in the application because he believes Boehm discloses a completely different probe from the probe described in the present application. Most importantly, the method of manufacturing the probe of Boehm does not include overmolding a sensor with a thermoplastic material. Instead, the injection molding step described by Boehm only affects the crimp portion of the probe and not the sensor which is a thermistor 16 (see col. 2, lines 43-64 and Fig. 2-3).

As shown in Fig. 2 of Boehm, a pre-mold 42 is injection molded so that nearly the entire crimp is encapsulated with plastic in order to protect the terminals 12, 14 from short circuiting to a sensor shell or other terminal (see, col. 2, lines 6-9 and lines 43-46). The pre-mold

42 may be assembled to the plastic shell using an interference fit 44 which covers the sub-assembly 10. Clearly, an interference fit, which is a mechanical type coupling, is different from covering a sensor and exposed length of wire by overmolding the sensor and the exposed lengths with a second thermoplastic material which is the same as or compatible with the insulating material (compare claim 1 and Fig. 3 of Boehm to claim 10 and Figs. 1-5 of the present application). Since Boehm does not teach or suggest the covering step recited in claim 10, Boehm does not anticipate the present invention.

Notwithstanding, Applicant reminds the Examiner that the claimed method refers to a sensor applied to a cable. As a result, at one end of the cable an exposed length of wire is soldered to a sensor (see, e.g., claim 10 and Figs. 1-5). In contrast, Boehm does not teach or suggest a cable and only discloses a thermal probe assembly having a connector (male terminals 12, 14). Moreover, as shown for example in Fig. 1 of Boehm, a portion of the wires 22, 24 are exposed near one end, and the male terminals 12, 14 are connected to the exposed wires 22, 24 by an “F” crimp 26, 28 which is in communication with the male terminals 12, 14 (col.2, lines 33-39). Thus, unlike the present invention, the exposed wires 22, 24 are separated from the sensor 16 by insulated wires 18, 20.

Additionally, Applicant most strongly disagrees with the Examiner’s statement that “...Boehm et al. teach a method of making a thermal probe assembly comprising steps of: introducing a sensor (16) and exposed lengths of wire into a covering element (44) made of an insulating material such as a plastic, which is compatible with the insulating material of a sheath of a cable (18, 20)...”. As already pointed out, Boehm does not disclose a cable. Further, what the Examiner indicates as covering element 44 is merely a plastic shell using an interference fit 44 which provides an open-ended socket 45 around male terminals 12, 14 (see col. 2, lines 53-56) and can be, for example, a metal housing 54’ (see, col.2, lines 63-64 and Fig. 5). The plastic shell is not a covering element as in the present application, nor is there any suggestion in Boehm of the plastic shell material’s compatibility with other materials of the thermal probe assembly such that a desired overmolding or fusion of insulating materials is provided as in the present application.

Applicant further disagrees with the Examiner’s position that Boehm teaches overmolding of a sensor and a covering element since it is understood that the dotted area surrounding, for example, the sensor 16 in Fig. 3 of Boehm is merely a thermoconductive paste

that is introduced into the plastic shell 44 prior to the interference fitting of the pre-mold 42, said paste being also present around the terminals 12, 14. Applicant also points out that it would be impossible to inject a thermoplastic material into the plastic shell since there is an interference fitting between the shell and the pre-mold 42.

Moreover, with regard to the rejection of claim 16, Boehm does not teach slipping a covering tube over the insulated portion of the cable as part of an introducing step which is followed by a covering step as claimed. Instead, as previously mentioned, the plastic shell used to provide a interference fit 44 in Boehm merely encloses the sub-assembly 10 as part of an assembly step for providing an open-ended socket around male terminals 12, 14 (col. 2, lines 52-56 and Figs. 1-3).

For all the reasons stated above, Applicant argues, most strenuously, that Boehm does not teach or suggest all of the elements of claims 10 and 16. Accordingly, reconsideration and withdrawal of the Examiner's § 102(b) rejection is respectfully requested.

The above arguments in support of the patentability of claims 10 and 16 apply equally to the §103(a) rejection of claim 15. Claim 15 is directed to a method wherein the covering element is a covering tube, and wherein the overmolding comprises injection molding the second thermoplastic material and the covering step comprises placing and blocking of the covering tube in a mold to prevent the covering tube from moving during injection of the second thermoplastic material (claim 15).

The injection molding process referred to in Boehm is related to forming the pre-mold insert 42 (col. 3, lines 21-23), and not to injecting insulating plastic material into a covering as recited in claim 15. The injection molding step described by Boehm cannot be compared to the overmolding step of claim 15, since Boehm does not teach or suggest placing and blocking the covering element in a mold to assure that the covering element retains its position over the sensor (see ¶ 23 of the present application). Thus, Boehm is related to a thermal probe assembly manufactured by a different process from that recited in claim 15.

Boehm also solves a different problem from that solved by Applicant in the present invention. The technical problem faced by Boehm is clearly stated as being able to provide adequate insulation of terminals and thermistor lead wires of a thermal sensor assembly in order to prevent vibration damage (see col.1, lines 15-18). This is accomplished by using an "F" crimp and a pre-mold to obtain a more vibration-resistant assembly (see col. 1, lines 56-66).

Importantly, Boehm teaches away from overmolding a sensor as in the present invention, stating that “. . . insert molding over the thermistor poses several problems such as thermistor show-through with plastic sensors, “hoop” stress, slower time response, and the possibility of solder reflow during an insert molding process.” (col. 1, lines 37-41). Thus, Boehm deals with the perceived problems associated with overmolding a sensor by turning to the use of a separate plastic or metal housing mechanically applied to a sensor terminal. This type of assembly and the problem solved from the invention of Boehm are very different from the improved method of manufacturing a temperature probe as claimed, since the present invention does not involve crimping (or other mechanical working), but instead describes a one-step injection molding. Since Boehm teaches away from the present invention, there is no suggestion or motivation in Boehm to modify the probe of Boehm in order to achieve the claimed invention. Accordingly, there can be no reasonable expectation of success from modifying Boehm to achieve the claimed invention. As a result, the present invention, as recited in claim 15, is not obvious in view of Boehm.

Notwithstanding any of the above arguments in support of patentability of the pending claims, Applicant provides the following table in order to clearly establish the different steps of Boehm’s process with respect to the claimed process:

step #	Boehm	Present Application
1	connecting a thermistor (16) to a pair of male terminals (12, 14) through two pieces of wire (18, 20) and an “F” crimp (26, 28)	connecting a thermistor (S) to a pair of wires (F) of a cable through soldering
2	injection-molding a pre-mold (42 or 46) which encapsulates a portion of the first finger (30, 32) and the whole second finger (34, 36) of the “F” crimp	introducing the sensor (S) and the exposed length of wires (F) to which it is soldered into a covering element (G or N or L)
3	interference-fitting the sub-assembly above into a plastic housing (44) OR crimping thereon a metal housing (54’)	injection-overmolding the covering element containing the sensor with a thermoplastic material compatible with said covering element and with the insulating sheaths (P) of the wires (F) so as to fuse them together

A comparison of the steps above makes evident that Boehm’s process involving two mechanical workings, in steps 1 and 3, with an injection molding step between, can in no way anticipate or

render obvious the claimed process that provides a single final injection molding step which results in the finished product.

In view of the forgoing amendments and Remarks, Applicant submits that claims 10-17 comply with the requirements of §112 and are patentably distinct from the cited prior art of record. Accordingly, reconsideration and withdrawal of the rejections, and an early Notice of Allowance are respectfully requested.

REQUEST FOR INTERVIEW

In the event that the Examiner does not now believe the application to be in condition for allowance, Applicant respectfully requests an interview with the Examiner to further discuss what amendments may be necessary for allowance of the claims. Applicant, by and through their undersigned counsel, will contact the Examiner in approximately one month to inquire as to whether it is necessary to schedule an interview with the Examiner.

Respectfully submitted,

MARIO NOLI

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(Date)

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